APPARATUS AND METHODS FOR CONTROLLING AN ANIMAL'S ACCESS TO FOOD

BACKGROUND OF THE INVENTION.

1. Field of the invention

This invention relates to various apparatus, and to methods employing such apparatus, for selectively allowing an animal access to its food, or preventing its access to another's food, the access contingent on the animal's relative weight.

2. The State of the Art.

Various animal or pet feeding devices are known, some of which are described in the following U.S. patents: 3,935,837; 4,164,200; 4,829,935; 5,109,799; 5,349,925; 5,433,171; 5,613,464; 5,709,169; 6,044,795; 6,138,608; and 6,349,671.

Of those devices, some are designed to make sure that sufficient food is present for the animal, and some have a timing mechanism that provides food and/or allows access to food based on a particular time or time of day (*e.g.*, a door timed to open every 12 hours).

One of the foregoing patents (5,709,169) provides a cover hinged to a platform by which the animal uncovers the food by stepping on the platform. However, in the case of an owner having two pets, it is often the case that the owner desires to segregate one animal's food from the other. Such may be the case where one of the animals is overweight, even though both animals should weight approximately the same amount. Or an owner might have two or more animals of very different sizes (weights), such as a large dog and a small dog (or a medium dog and a cat), and one (or both) requires a special diet that the owner wants to prevent the other animal from accessing. Or an owner might have a

kitten or puppy and an older cat or dog and wants to leave food out for the kitten or puppy while preventing the older cat or dog from accessing the food.

None of the foregoing devices provides selective access to food based on a physical parameter of the animals, and especially not its weight.

SUMMARY OF THE INVENTION

One object of this invention is to provide a device that allows access to food only for one animal weighing less than a second animal, or being the lightest of multiple animals, or weighing less than a predetermined weight.

Another object of this invention is to provide a device that allows access to food only for one animal weighting more than a second animal, or being the heaviest of multiple animals, or weighing more than a predetermined weight.

Yet another object is to provide the foregoing devices without needing resort to any electronics, timers, or motorized parts.

In one embodiment, this invention provides a device for controlling access of an animal to food, which apparatus comprises a chassis movable with respect to a base, a port in the chassis through which food is accessed, and a door for opening and/or closing the port, the chassis and the base moving closer when an animal's weight is imparted to the chassis, a force adjustable by the user that opposes the animal's weight, and a mechanism for opening and/or closing the doors based on movement between the chassis and the base.

In another embodiment, this invention provides a method for controlling access of an animal to an opening in which food is stored, comprising providing a platform on which the animal places its feet and having an opening through which the animal can access food, providing at least one movable door for preventing access to the food, providing a base to which the platform is connected and allowing vertical movement of the platform towards and away from the base, providing a lever that engages and moves the door as a function of the distance

between the platform and the base, providing tension on the lever to inhibit engagement of the lever with the door, and allowing an animal to stand on the platform, thereby causing the platform to move vertically towards the base if the weight of the animal is sufficient to overcome the tension, such movement rotating the lever and engaging the lever with the door to move the door to either prevent access or to provide access, as the case may be for the configuration of the device. By "stand" it should be understood that a four-legged animal may stand on the platform with only two feet, or may stand with four feet.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 depicts an idealized plan view of one embodiment of the invention with access to the animal's food.

Fig. 2 depicts an idealized side view of the embodiment in Fig. 1.

Fig. 3 depicts an idealized plan view of one embodiment of the invention with access to the animal's food denied.

Fig. 4 depicts an idealized side view of the embodiment in Fig. 3.

Fig. 5 is an idealized perspective view of the aesthetic appearance of the device.

DETAILED DESCRIPTION OF SPECIFIC EMBODIMENTS

The invention will be described with reference to a device where access to the food is normally permitted to a first animal of a given weight and is denied to a second animal having a greater weight or a lesser weight.

With reference to Fig. 5, from the user's, and animal's, point of view, what is seen is the device 501 including a platform 503 supported within a skirt 505 and enclosed partially by a screen or shield 507 having an opening 508 permitting access to an area 509 in which food is normally found. Shown in this figure, access to the food bowl is prevented by doors 511a and 511b. A tension

knob 513 is presented for easy adjustment by the user, and its function will be described later.

The platform is disposed over and in contact with a chassis 101 as shown in Fig. 5, or is integral with the chassis as shown in Figs. 1 and 2; as used herein, a chassing having a standing surface includes both of these embodiments (that is, a separate platform attached to the chassis, or a unitary chassis-platform construction). The chassis is supported on a base 103 having four supports, two 105a/b of which are labeled in Fig. 2, each having a bore 107a/b for connection to a parallel arm 109a/b that engages the chassis at a pivot 111a/b. Such a connection is essentially a parallel rule in a plane form, as is seen in Fig. 1, so that the chassis moves vertically with respect to the base by the pivoting of the parallel arms. The parallel arms are preferably both in a "C" shape and made of metal (steel), the shape being useful for preventing twisting or rotation of the chassis with respect to the base, and metal being generally more durable than plastic. As shown, the pair of parallel arms and the chassis and the base form a parallelepiped, as seen in side view in Figs. 2 and 4. If the weight were not well-distributed through this configuration; for example, if there were four separate pivot arms instead of two such pivot arms being merged into a single C-shaped arm, the pivots could jam.

As mentioned, the embodiment shown is described with reference to denying access to food to a heavier animal. Preferably, the device is thus designed as shown in these figures, with the doors 511a/b in a normally opened position. A food bowl with food is placed within the opening 509 and resides on the base (or may be supported along the periphery of the opening 509).

To close the doors when the heavier animal steps onto the platform, a combination of a type of bell-crank lever, a slider, and a tension rod are used. The lever 113 is attached to the chassis at a pivot 115 at it center, with one arm interacting with the base at wheel 117. The wheel can be substituted with a pivot

attached to the base, or with the arm of the pivot sliding on the base. The other end 119 of the lever acts as an abutting device. From the viewpoint shown in the figure, the lever rotates clockwise about pivot 115. Proximate the abutment end of the lever a rod 121 is connected to the lever at a pivot 123. The rod extends through an opening 124 in a wall 125 formed within the chassis and continues on. A helical (coil) spring 126 is disposed under compression around the rod and along the length of the rod and is secured between the wall 125 and a wing nut 127 engaged with a threaded portion 129 of the rod, the rod and spring combination being a tension rod. Accordingly, the tension on the spring from the wing nut effects the force needed to rotate the lever and move the tension rod. The adjustment knob 513 shown in Fig. 5 is the end portion of a cylinder 515 having a channel 517 in which the wings of the wing nut resides, so that turning the adjustment knob turns the wing nut, thereby altering the tension on the rod. Although not desirable, an elastic, compressible material can be substituted for all or part of the spring, or a different type of spring (such as a leaf spring) can be used. Each of these can be considered as a spring.

The abutment end of the lever pushes against a slider bar 131, which is part of a slider 132 that moves within and along the edge of an opening in the chassis. The slider arm interacts with abutment cams 133a/b at the ends of the doors 511a/b. The doors rotate on their own pivots 135a/b, and are maintained in an open position by means of a spring 139 disposed between posts 137a/b or otherwise attached to and spanning the doors. The slider can be integral, or hingeably connected, with the other end 119 of the lever, so that engagement of the lever end 119 with the cams includes engagement through a device such as the slider bar 131.

In operation, the adjustment knob is set so that an animal over a predetermined weight will have sufficient weight to close (or open) the doors. In the presently shown embodiment, a lighter animal will be able to put weight on

the platform (whether standing on the platform or putting only the front feet on the platform) and eat from the bowl without the doors closing. (Alternatively, the device can be configured so that it requires the animal's weight to be greater than the predetermined weight to open the doors.) Thus, when an animal that is above the predetermined weight (or with just the front feet is greater than the predetermined weight) steps onto the platform, the animal's weight is supported effectively by, and activates movement of, the chassis. The chassis will tend to move down and back (to the left in the drawings) because of the parallelepiped configuration. As the chassis moves towards the base, the wheel attached to the lever will engage the base and cause the lever to rotate around the pivot 115 (clockwise as depicted in Fig. 2) so that the abutment arm of the lever moves against the slider bar, to the right as depicted in the figure. The force opposing this rotation is the tension from the spring transmitted through the rod to the abutment end of the lever, moving it to the left as depicted in the figure. Thus, the adjustment knob sets the tension in the spring corresponding to an animal of a predetermined weight. An animal weighing more than the predetermined weight will overcome the spring force, causing the chassis to move down toward the base and the abutment arm of the lever to move against the slider bar. The slider bar then presses against the abutment feet (cams 133a/b), forcing the doors to pivot closed because of the position of the abutment feet (cams 133a/b) with respect to the door pivots. Generally, the force of the spring on the tension rod is significantly greater than the force of the spring keeping the doors open so that the door spring does not significantly affect the force (or weight) needed to close the doors.

As seen in Figs. 3 and 4, when an animal above the weight threshold steps onto the platform, the platform and chassis move toward the base and the abutment end of the lever moves against the slider arm, forcing the doors closed. Although the drawings are not drawn to scale, it can be seen that the wall 125

moves backwards by reference to its distance from the pivot bar 109b, seen vertically comparing Figs. 2 and 4.

When the animal steps off the standing surface (whether a separate platform or one integral with the chassis), the spring tensions repositions the door to their initial position (open or closed). Of course, an elastic material (such as an elastic band) can be substitued for the spring.

Based on the foregoing, it should be apparent that various modifications and changes can be made without departing from the scope and spirit of the invention as defined by the appended claims. For example, instead of the pivot bars, the base and chassis can cooperate via slides (*e.g.*, a rod disposed in a sleeve). It is preferred that the chassis be supported at the corners of the platform so that the weight is relatively evenly distributed to facilitate operation of the mechanisms. Further, as mentioned, the parallel arms are shown as two separate C-shaped devices, although each pivot arm could be separated into two (connecting only the adjacent pivots 105 and 111). Instead of a heavier animal causing the doors to close, the heavier animal can cause the doors to open if the cams for the doors are reversed so that the door and pivot combination is arranged more like a pair of scissors. The shield shown in Fig. 5 is beneficial for reducing the size of the device, since the food is stored near one end of the platform edge, to prevent another animal from just leaning over the shield necessitates that animals attempting to access the food do so only through the opening. The presence of the shield (or cowl) also allows the footprint of the device to be smaller by providing an enclosure or nook having a particular opening area and with the food disposed the farthest distance away from that opening area. Because the shield allows for a smaller platform, the animal need only place its front feet/paws on the platform. The shield is preferably transparent or translucent. The food should be sufficiently distant from the opening in the shielding that the animal must place its front feet/paws on to the platform in order

to access the food. The device also can be made larger, so that the animal must have all four feet on the platform to be able to reach the food. The lever 113 can be made as a cam, or the mechanism can use a spring tensioned between the chassis and the base, and movement between the chassis and base transmitted by a belt to chain to a gear or cam mechanism for opening or closing the door(s). The tension rod can be replaced in whole or in part by a counter-weight.

The device is preferably made from molded plastic. The wheel and the abutment end of the lever can be made of a different type of plastic than the chassis, base, etc. to provide the desired friction: the abutment needs to slide, so a plastic such as DELRIN brand acetal resin or a nylon, and the wheel should frictionally engage the base or may also slide. The pivot arms 109a/b and the springs, tension rod, and wing nut are preferably metal.

Thus, the invention includes a chassis movable with respect to a base and having an opening through which food is accessed and a door for opening and/or closing the opening, the chassis and the base moving closer when an animal's weight is imparted to the chassis, a force adjustable by the user that opposes the animal's weight, and a mechanism for opening and/or closing the doors based on movement between the chassis and the base.

Given the foregoing disclosure, it is seen that the present invention has related applications instead of just the feeding of pets or livestock. For example, a plaform can be suspended in a tree or on a pedestal with bird food, and the device adjusted to prevent, for example, a squirrel or racoon from accessing the bird food.

Returning to pet owners, an owner having two pets may desire two of these devices, one designed to prevent the heavier animal from accessing food (closing the doors if the heavier animal steps on the device) and the other

designed to allow only the heavier animal access to the food (opening the doors if the heavier animal steps on the device).

The foregoing description is meant to be illustrative and not limiting. Various changes, modifications, and additions may become apparent to the skilled artisan upon a perusal of this specification, and such are meant to be within the scope and spirit of the invention as defined by the claims.